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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,997	09/18/2003	Eric Duchesne	END920030026US1 (16594)	6606
23389	7590	03/07/2005	EXAMINER NOVACEK, CHRISTY L	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			ART UNIT 2822	

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/665,997	Applicant(s) DUCHESNE ET AL.	
	Examiner Christy L. Novacek	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on January 28, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/18/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the election filed January 28, 2005.

Election/Restrictions

Applicant's election with traverse of claims 11-20 in the reply filed on January 28, 2005 is acknowledged. The traversal has been found persuasive, thus the restriction requirement stated in the office action mailed on January 11, 2005 is withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Oda et al. (US 6,489,668).

Regarding claims 1 and 11, Oda discloses providing a semiconductor chip (18) having a first surface in electrical communication with a substrate (14/46), arranging a heat spreader (42) in a closely spaced relationship with an opposite surface of the semiconductor chip, and adhesive means bonding the heat spreader to the chip, wherein the adhesive means includes an electrically conductive adhesive (70) on a center or areal surface portion of the chip and an electrically non-conductive adhesive (68) extending about the electrically conductive adhesive for concurrently bonding the heat spreader to the semiconductor chip (Fig. 1, 2, 6; col. 5, ln. 1 – col. 6, ln. 68).

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Regarding claims 2 and 12, Oda discloses the heat spreader includes an electrically conductive material (42) forming an electrical connection with the semiconductor chip through the electrically conductive adhesive (col. 6, ln. 53-57).

Regarding claims 3 and 13, Oda discloses that the heat spreader is constituted of a metallic heat-absorbing and dissipating material (col. 8, ln. 15-20).

Regarding claims 4 and 14, Oda discloses that the heat spreader is copper (col. 6, ln. 53-57; col. 8, ln. 15-20).

Regarding claims 5 and 15, Oda discloses the heat spreader includes a plate-shaped lid or cap member adhesively bonded to the chip (col. 6, ln. 53-57; col. 8, ln. 15-20).

Claims 1-5 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Barber et al. (US 6,590,292).

Regarding claims 1 and 11, Barber discloses providing a semiconductor chip (130) having a first surface in electrical communication with a substrate (100), arranging a heat spreader (150) in a closely spaced relationship with an opposite surface of the semiconductor chip, and adhesive means bonding the heat spreader to the chip, wherein the adhesive means includes an electrically conductive adhesive (160) on an areal surface portion of the chip and an electrically non-conductive adhesive (140) extending about the electrically conductive adhesive for concurrently bonding the heat spreader to the semiconductor chip (Fig. 1-3; col. 4, ln. 60 – col. 6, ln. 21).

Regarding claims 2 and 12, Barber discloses the heat spreader includes an electrically conductive material (150) forming an electrical connection with the semiconductor chip through the electrically conductive adhesive (col. 5, ln. 43-45).

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Regarding claims 3 and 13, Barber discloses that the heat spreader is constituted of a metallic heat-absorbing and dissipating material (col. 5, ln. 43-45).

Regarding claims 4 and 14, Barber discloses that the heat spreader is copper (col. 5, ln. 43-45).

Regarding claims 5 and 15, Barber discloses the heat spreader includes a plate-shaped lid or cap member adhesively bonded to the chip (col. 5, ln. 43-45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al. (US 6,489,668) in view of the admitted prior art.

Regarding claims 6 and 16, Oda discloses that the electrically conductive adhesive electrically connects the heat spreader and the semiconductor chip, but does not disclose that the electrically conductive adhesive is a silicone. The admitted prior art discloses that electrically conductive silicone adhesives are well-known in the art for the purpose of providing electrically grounding of circuits (pg. 3-4). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a silicone material for the electrically conductive adhesive of Oda, because it is conventional to use these materials for the purpose of grounding a circuit.

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Claims 6, 7, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barber et al. (US 6,590,292) in view of the admitted prior art.

Regarding claims 6 and 16, Barber discloses that the electrically conductive adhesive electrically connects the heat spreader and the semiconductor chip, but does not disclose that the electrically conductive adhesive is a silicone. The admitted prior art discloses that electrically conductive silicone adhesives are well-known in the art for the purpose of providing electrically grounding of circuits (pg. 3-4). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a silicone material for the electrically conductive adhesive of Barber, because it is conventional to use these materials for the purpose of grounding a circuit.

Regarding claims 7 and 17, Barber discloses that the electrically non-conductive adhesive is thermally conductive and conveys heat from the semiconductor chip to the heat spreader, but Barber does not disclose that the electrically non-conductive adhesive is a silicone. The admitted prior art discloses that it is well-known in the art to use a thermally conductive silicone adhesive to attach a semiconductor chip to a heat sink (pg. 3). At the time of the invention, it would have been obvious to one of ordinary skill in the art to thermally conductive silicone adhesive to attach the chip of Barber to the heat sink because the admitted prior art states that this process is conventional.

Claims 8-10 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al. (US 6,489,668).

Regarding claims 8 and 18, Oda discloses depositing the electrically conductive adhesive on the areal surface of the chip to form a small bond area (68) with the heat spreader. Oda does not disclose that size of the bond area. At the time of the invention, it would have been obvious

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to one of ordinary skill in the art to use routine experimentation to determine an appropriate bond area size, depending upon the coefficients of thermal expansion of the chip and the heat spreader and the adhesive material, because such variables of art recognized importance are subject to routine experimentation and discovery of an optimum value for such variables is obvious. See *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding claims 9 and 19, Oda discloses that the electrically non-conductive adhesive is deposited on the chip so as to cover the remaining surface area of the chip extending about the electrically conductive adhesive.

Regarding claims 10 and 20, Oda discloses a space between the chip and the heat spreader but does not disclose the thickness of the space. At the time of the invention, it would have been obvious to one of ordinary skill in the art to use routine experimentation to determine an appropriate bondline thickness, depending upon the coefficients of thermal expansion of the chip and the heat spreader and the adhesive material, because such variables of art recognized importance are subject to routine experimentation and discovery of an optimum value for such variables is obvious. See *In re Aller*, 105 USPQ 233 (CCPA 1955).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN

March 3, 2005



AMIR ZACCARIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2822